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NOVEMBER, 1938

Editorial

THE R.C.V.S. COUNCIL ON THE LOVEDAY REPORT

IN our last issue we published a summary of the conclusions and recommendations made by the Loveday Committee in regard to veterinary education. In the meantime the Report has been under consideration by a Special Meeting of the Council of the Royal College of Veterinary Surgeons and at its first sitting the following resolutions were passed :—

(i) That the Council is strongly opposed to the recommendation contained in Para. 29 (i) of the Report that the Charter of the Royal College of Veterinary Surgeons should be amended to provide for the appointment of direct representatives of the Universities of London, Liverpool, Edinburgh, Glasgow and Cambridge on the Council of the College.

(ii) That the Council expresses its disapproval of the recommendation in Para. 29 (iii), namely, that the said Universities should consider the institution of a degree in Science which veterinary students can obtain in the first three

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years of their course after studying the subjects required for the corresponding M.R.C.V.S. examinations.

We are informed that a statement is to be prepared for publication, after approval by the Council, embodying the reasons for adopting these resolutions.

The main arguments against the recommendations of the Committee are understood to be:

1. That the Committee have overlooked the fact that the duties of the Council cover many matters affecting the profession, in addition to examinations, and that it would be most improper that such duties should be shared by members of Council who are not also members of the College. The Council is convinced that it is the desire of the profession that the Council should continue to be elected by the members of the College as heretofore.

The suggestion made by the Committee that unless their recommendation is given effect to, the Council will be in danger of lacking skilled guidance in the development of veterinary education, is very uncomplimentary (to say the least of it) to the present Council. There is in fact no danger whatever that under the existing constitution the Council will be deprived of the collaboration of the Principals of the affiliated Colleges in their deliberations, and there seems in fact to be no real ground for requiring any amendment of the Charter such as is suggested.

2. The second important recommendation, that a degree should be instituted which candidates could take at the end of their third year, is also rejected by the Council, on the ground that such a degree would degrade the present high status attaching to the existing veterinary degrees, without any compensating advantage. The Council are of opinion that students trained in a University away from a Veterinary School would not gain the full advantages of a university education and would lose, what is much more important to them, the benefit of association with veterinary students and veterinary teachers, and the benefit of daily contact with animal patients. It is contended that with all the precautions suggested by the Committee, a student who left the University with a degree after passing in the subjects of the first three years of the curriculum would be at a serious disadvantage in beginning his clinical studies in his fourth and fifth years, and that he would find it extremely difficult to fit himself into the new conditions.

There is also the grave risk that a degree of this kind, gained by instruction in (or officially acknowledged by) a Veterinary College might be utilised by the unscrupulous as a licence to practise, and thus add to our already large army of quacks. Such degree holders could not, it is true, call themselves by the title of "Veterinary Surgeon," but every practitioner knows only too well that this is the only privilege the Veterinary Surgeons' Act confers; and that the charlatan, whether his fancy lies in doctoring dogs, cattle or horses, knows full well how far he can go without placing himself within reach of the arm of the law.

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These two proposals are those which most closely concern the R.C.V.S. and its relationship to the affiliated Colleges. There are other recommendations in the Report on which it is understood an expression of opinion by the Council will be made shortly.

With these reservations we would express our satisfaction with those conclusions of the Committee which relate to the important functions which the veterinary profession can perform for the benefit of the community. Especially are we glad to note the decision of the Committee that a multi-portal system of entry into the profession would not be to its advantage, though we could have wished that this decision had been reached with less emphasis on the alleged and supposed defects of the one-portal system. And finally we must in all justice acknowledge the generosity of the recommendations made for grants in aid of the Veterinary Schools. We trust that these may soon be implemented by the Treasury.

THE PIG AND BACON INDUSTRY

At the present time it is especially appropriate that, as an attempt is being made to resuscitate the Pig Marketing Board for the benefit of the farmer and bacon curer, an article on the subject by Lt.-Col. Dunlop Young, illustrating what is being done in other countries (especially that of our great trade rival in this respect—Denmark) shall be found in this issue.

In that article especial attention is drawn to the fact that the Danes have for some time made up their minds as to the special crossing of those breeds which give what the bacon factories desire and are most willing to pay for. In order to get these results a great deal of scientific work has been done on the animal husbandry side of the question, and one of the chief lessons which the farmer might take to heart is that in arriving at these results his Danish *confrère* has very considerably lessened the numbers of his breeds. To get the bacon pig as near as possible what is desired by the consumer, without waste in cutting up of the various body parts, has been the end which was aimed at; and the manner in which the Danes have succeeded is fully illustrated by the success whereby they have captured the taste of the British bacon consuming public, and the consequent sale of the finished article at a price which enables the importer to successfully retail it to the British market. It seems astonishing to the ordinary member of the public that bacon can be brought over from a foreign country and sold in Great Britain in such quantity and at prices which are so obviously competitive. There is something wrong with British husbandry, and it is to be hoped that this second attempt to help the farmer and the bacon curer in this country by the re-formation of the Pig Marketing Board will, on this occasion, have the desired effect of so stimulating home production, that it will again take its place in the first line of providing the breakfast for the British people with this food from a British source.

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General Articles

PIG BREEDING AND THE BACON INDUSTRY IN DENMARK*

By LT.-COL. DUNLOP YOUNG, O.B.E., M.R.C.V.S., D.V.S.M.

THE word "Danish" has, for many years, become a household word as indicating good bacon, and deservedly so, because of its good quality, proportion of lean to fat in the requisite places, fine texture and flavour. The flavour of Danish bacon seems to suit the palate of the British public, and the short distance of Denmark from Great Britain favours that country in that a mild cure can be used whereas bacon produced in some countries has to withstand longer transport and storage, therefore, has to be kept a longer time in brine. It seems to be generally considered that the aforesaid qualities of Danish bacon are due, in a great measure, to the type of pig raised in that country.

We obtain 63 per cent. of our imported bacon from Denmark; for the nine months ended September 30, 1938, 2,561,039 cwts. of "Wiltshire" cure bacon were imported into Great Britain from Denmark.

The Danish Pig

According to information supplied from a reliable source, there are about 3,025,000 pigs in Denmark. The Danish Landrace pig was, in the seventh century, judged by an old sketch, a poor specimen of a bacon pig.

The Danish Government Committee on Live Stock Research, with the association of Danish Co-operative Bacon Factories, are continually doing good work by studying how to improve the type of pig and the methods of feeding in order to maintain, and if possible enhance, the high reputation of Danish bacon. The old Landrace pig was improved by crossing with the English York or Large White, and at one time nearly 80 per cent. of the pigs in Denmark were of the York type. Gradually a new or improved pig was evolved which is considered the best bacon pig in any country. The special features are long body (some boars are two metres in length) good hams and loins, with light forward sloping shoulders and neck. Anatomically it is interesting to note that the scapula of the Danish pig is smaller and lighter

* With the kind permission of the Deputy Minister of Agriculture, Canada, per Dr. Hilton.

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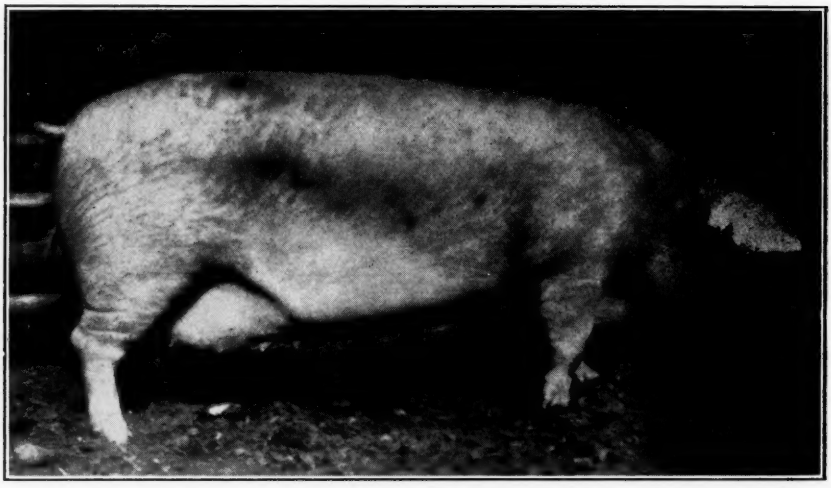

No. 1.—Danish Landrace Sow.

ARTICLE BY LT.-COL. T. DUNLOP YOUNG, O.B.E., M.R.C.V.S., D.V.S.M., ON PAGE 408.

than that of the York, and the cavity from which the scapula is extracted is correspondingly smaller.

The studies referred to are carried out on farms under the supervision of the Agricultural Research Laboratories of the Royal Veterinary and Agricultural Colleges.

All costs are paid by the Association of the Danish Co-operative Bacon Factories.

There are a few herds of the pure York still in Denmark, but only about 10 per cent., so that to-day there is practically only one type of commercial pig in Denmark, the improved Landrace, and a very fine type it is.

Britain does produce as good bacon pigs, but the drawback, as has been so often pointed out by such an authority as the late Mr. Marsh, J.P., is the lack of quantities and consistent uniformity. Britain may be said, from a bacon curer's point of view, to have too many breeds of pigs, and each breeder claims that his is the best.

There seems no doubt that an excellent bacon type of pig could be produced by crossing the Large White with a selected breed, e.g., Tamworth, Lincoln or Welsh, Wessex or Essex; the important point being to establish a commercial, apart from a pedigree, type of pig following the Danish lines adopted after long and careful experiments. The Danish Committee on Pig Breeding refuse to sell at any price, to any country, their improved Landrace pigs, but there should be no need to buy them because, as stated, by careful study and selection, an ideal bacon pig can be produced in Britain and the Dominions. Once this is done, there should be no need to depend upon Denmark or any other country for our bacon supplies, but in addition to evolving a bacon type of pig, its cheap production is an important factor in relation to competition.

Cheap Production

In universal competition cheap production is one of, if not, the most essential factors, and the question is often asked how is it that the Danish breeders and feeders can buy pig food in this country, take it to Denmark, feed pigs, and compete successfully against British producers.

The explanation is that Danish producers are, in general, smallholders. An average farm consists of twenty hectares (49.420 acres), carrying about sixteen cows, twenty pigs and poultry. Practically the whole of the work on the farm is done by the members of a family, so labour expenses are low and all profits go into the family purse. Cottagers purchase skim milk from the butter factories and feed pigs.

It is important to emphasise that milk and barley are the basic foods supplied to the Danish pigs, and to this is attributed the consistent flavour of Danish bacon. Other foods are used in limited proportion, such as rye, wheat, maize, sugar-beet, potatoes, turnips, whey, oil cakes, blood, meat, bone and

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fish meals, and dried yeast in limited and regulated proportions, depending on their composition. Small quantities of phosphates, carbonates, iron, iodine and chlorides are added, and only fish meal from approved makers is used. The quantitative proportions are issued in table form, also alternative diet scales, by the Research Association, the aim being that feeders may produce an increase in the weight of their pigs at as little cost as possible, and also to produce the required uniform quality at the same time. Recent experiments have shown that bacon from milk-fed pigs gained highest points, especially for uniform fine texture and flavour; the following particulars, giving the results of experiments carried out by the West of Scotland Agricultural College, as published in the "Pig Breeders' Annual for 1936/7," bear this out. The report states:—

"The ration used was very simple and consisted solely of separated milk and barley meal from weaning stage onward. The commencing daily allowance per pig, ½ lb. barley meal and ½ gallon separated milk; this allowance was increased weekly in order to keep pace with development and live weight increase until the daily allowance per pig reached 3 lbs. barley meal and 3 gallons separated milk. Progress was good throughout the entire feeding period and the average daily live weight increase was 1.21 lbs. per head per day.

"For 1 lb. live weight increase, 1.3 lbs. meal plus 1.3 gallons of separated milk were required.

"The flavour and texture of the bacon was slightly in advance of that derived from the standard ration. Separated milk powder and whey powder also gave good results, more especially in the early stages following weaning."

The Health Committee on the Basis of Nutrition, referring to milk, states:—

"Milk should form a conspicuous element of the diet of all ages. Skimmed and separated milk, although deprived of its vitamin A by removal of the fat, retains proteins B and C, vitamins, calcium, and other mineral elements, and is of highly nutritional value."

It appears, therefore, that milk is an essential part of pigs' food, more especially at the weaning period, so that the young pigs never suffer from a check due to change of food. The pigs are weighed periodically with the amount of food given, records kept and utilised by the Research Laboratories to enable improvements to be made in the diet scales, both from a nutritive and price point of view.

Milk Production

It is an accepted fact that pig production is always most successful when associated with dairying.

Most people seem to be of the opinion that the Friesian cow is the milk producer in Denmark, from which we obtain the renowned Danish butter;

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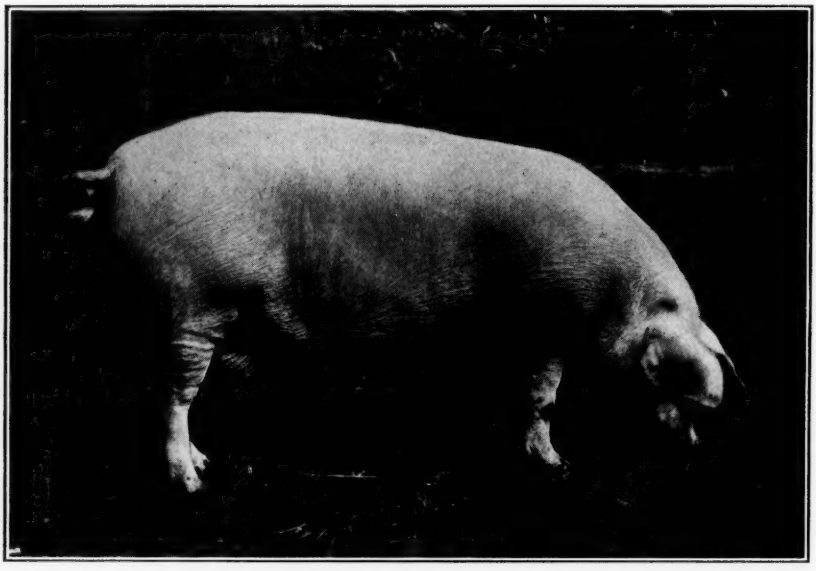

No. 2.—Danish Landrace Boar.

ARTICLE BY LT.-COL. T. DUNLOP YOUNG, O.B.E., M.R.C.V.S., D.V.S.M., ON PAGE 408.

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but this type of cow is only kept in the Jutland area of that country. The Danish Red Cow is the typical milk producer, and a very fine specimen she is, resembling in appearance the large Devon or the Sussex.

The bulls have peculiar markings on the skin, resembling somewhat the flowery appearance on windows on a frosty morning. These can be observed on the side of the Champion Bull photograph, and a close-up taken photograph gives a better view of the markings.

The cows give large quantities of milk, high in butter-fat content, and they are very docile; the male calves make good vealers or fat oxen. Cows are tethered in the fields and moved every day.

Tuberculosis Eradication

Eradication of tuberculosis is being vigorously carried out with the aid of the Co-operative Farmers' Association. Intradermal tests are carried out by local veterinary surgeons approved by the Minister of Agriculture. The eradication is conducted on voluntary lines, but if the farmers in a Co-operative area have 90 per cent. of the cows tested, and the owners of the remaining 10 per cent. do not wish to have their cows tested, the Chairman of the Co-operative Association can apply to the Minister of Agriculture to have the 10 per cent. tested, and this is compulsorily done. Since 1937 no milk except that from tuberculin-tested cows is allowed to be sold in Copenhagen, and only hornless cattle are used.

Housing

The average number in a litter of pigs is eight and practically all pigs are fed indoors. The outdoor system, advocated in Britain by some feeders, is not approved in Denmark, and it is a physiological fact that the less muscles are used, the finer they are and consequently more tender.

Prices Paid for Bacon

In England prices were fixed for six months in advance; this method often lead to great dissatisfaction because, if prices in the open market rose, the producer who had contracted to send his pigs to the bacon factory saw his non-contracting neighbour receiving much higher prices than he obtained. In Denmark prices are fixed weekly by a committee based on the prices obtained at the London and Manchester markets for the week. By so doing, complaints as to prices are as far as possible obviated.

Danish Co-operative Factories (Bacon)

When it is proposed to commence a factory a meeting of farmers is held, a committee formed, lists of farmers who have agreed to deliver pigs to the factory are issued. When the list of signatures show that 15,000 to 20,000

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pigs can be supplied the signatures are binding and each producer pledges himself to supply all the pigs he can produce.

The committee then appoint a management committee with the necessary officials, obtain estimates for building the factory and arrange with banks about credits.

All Co-operative members are jointly and separately liable to loans and expenses. The producers who have signed the agreement are bound to send all their pigs to the factory for ten years. After this period the establishment costs are usually written off, the whole factory, as a going concern, is valued and members who desire to leave the factory can do so. Those who leave are paid a share of the value calculated on the number of pigs they have sent to the factory during the ten years.

Government Control

Before the factory is established application must be made, per the local chief of police, to the Ministry of Agriculture. The application must be accompanied by plans of the buildings, water supply, drainage and hygienic arrangements. If the Ministry approve they allocate a registered number to the factory and a controlling veterinary officer, with assistants who have fixed salaries which must be paid by the factory committee. The controlling veterinary officer has in his personal possession the stamps and labels to be used in the factory. The Ministry of Agriculture may cancel the authorisation of the use of the factory if they consider it necessary. The factory and its operations are controlled by the veterinary officer; laboratory accommodation, light and heat are supplied by the factory; he has admission to every part of the factory. No meat, offal or by-product can be taken from the factory without the approval of the veterinary officer, or exported without his stamp.

The state of health and cleanliness of the workpeople are under his supervision; complete registers are kept by this officer and weekly reports sent to the Chief Veterinary Officer at the Ministry of Agriculture. The factory management must carry out all decisions made by the veterinary officer, but can appeal to the Ministry of Agriculture if necessary.

Size of Factories

These vary in killing capacity from 50,000 to 125,000 per annum.

Ante and Post-Mortem Examinations

All animals must be examined by the veterinary officers alive and after slaughter. All organs must be present and identifiable at the time of examination. Decisions are made in accordance with rules issued by the Ministry of Agriculture. Not more than sixty pigs per hour are to be examined by one veterinary officer. All inspectors are qualified veterinarians; no lay meat

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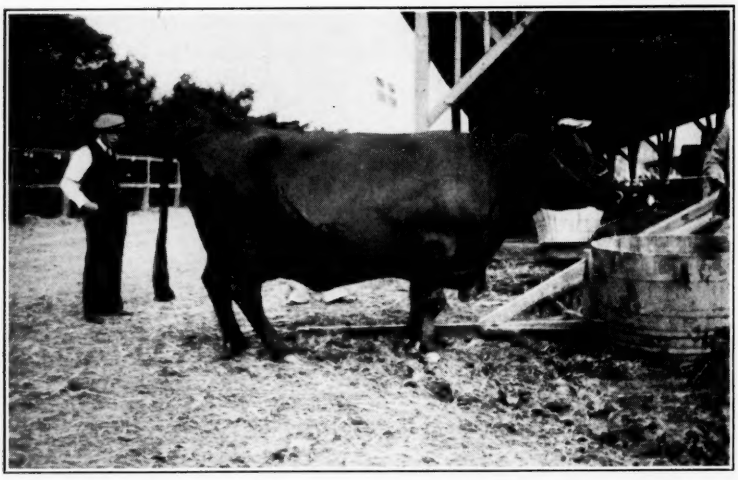
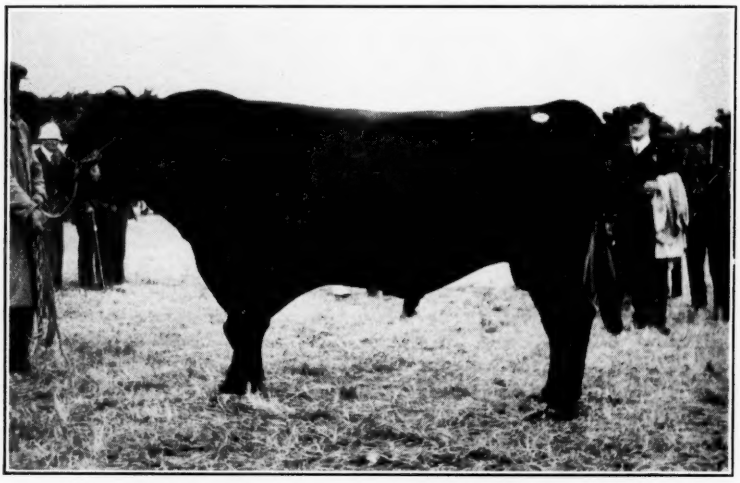


No. 3.—Danish Red Cow.



No. 4.—Danish Red Bull.

ARTICLE BY LT.-COL. T. DUNLOP YOUNG, O.B.E., M.R.C.V.S., D.V.S.M., ON PAGE 408.

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inspectors are employed. If more than sixty pigs per hour are being killed, additional officers must be employed.

All non-edible meats and offal with diseased or unsound food are set apart as unfit for human food and converted into meat-meal, blood flour, fats, manure, etc.

Transport of Pigs to Factory

Transport of fattened pigs is done by horse-drawn, motor or railway vehicles, and great care is taken to avoid bruises.

The pigs are ear-marked before they leave the farm with a tin plate bearing the number of the member of the factory. On arrival the pigs, if the member desires, are weighed before being put into the pens; each pen holds twenty-five to thirty pigs.

Slaughter of Pigs and Operations

Killing takes place three or four days per week. All pigs enter the stunning pen where they are stunned by an electrically operated apparatus, lifted by one hind leg on a hoist to a rail and conveyed to a special pen where they are bled out of sight of the live animals. The blood is collected into a tank and boiled, the carcase hangs for fifteen minutes and is then conveyed to a scalding tank and contained there for three minutes in water at a temperature of 50 deg. C., then lifted automatically into a " dehairer "; from there on to a scuttling table, carefully scraped and toed, and passed through a singeing stove for about 15 seconds, then they pass on the rail through a shower spray and are finally finished by careful scraping, the head receiving special washing and trimming.

The carcase is now opened, the organs removed, examined by the meat inspector, as also the carcase itself. The carcases, passed as sound, are split into two sides and weighed on the sliding rail scale; 4 per cent. is allowed for shrinkage, the weights and ear-marked numbers are entered into a register.

Uniformity of the Danish Pig Carcases

It is interesting to observe rows of Danish pig carcases practically all similar in shape, size and weight. The carcases hang in the cooling room in atmospheric temperature, the heads are cut off and the flairs removed; next day they are, now in two sides, trimmed, that is, fillets (psoas muscles) removed, vertebræ sawn off, scapula taken out and generally trimmed to conform to the Wiltshire style of bacon. They are then refrigerated at about 4 per cent. C. for twenty-four hours, and conveyed to the pickling tanks; the thick parts are brine pumped, the needles used must bear the stamp of the committee and veterinary officer; pressure about 90 lbs. per square inch, strength of brine 22 deg. Baume. Shoulder pockets are filled with salt; brine

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is prepared in a special tank, filtered, and is used again with fresh brine added. Internal temperature of the thick parts of the sides must be 44 deg. C.; the sides are held down in the brine tanks by means of levers, kept in the solution for 96 hours, and after withdrawal from the tanks, drained for 48 hours. The sides are then baled four sides in a bale and are now ready for export.

Grading

Grading is one of the most important factors in Danish bacon. Measurements are taken at three points: (a) where the fat is thickest over the shoulder; (b) at the centre of the middle piece; (c) from the top of the muscle which enters into the fat over the loin.

All bacon exported to Great Britain and Ireland must be branded DANISH and graded into three classes:—

No. 1.—If the measurements at A, B and C do not exceed 5 cm. (1.92 inches), 3 cm. (1.15 inches) and 3 cm. (1.15 inches) respectively in thickness.

No. 2.—If the measurements do not exceed 5½ cm. (2.11 inches), 3½ cm. (1.35 inches) and 3½ cm. (1.35 inches).

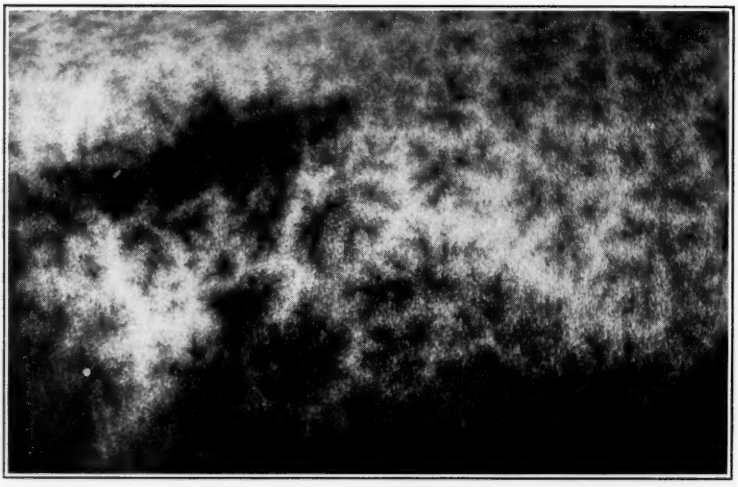
No. 3.—If the measurements exceed those of No. 2.

The grading is severe in order to maintain a high standard, in fact it is agreed that all the best bacon is exported and the rejects consumed in Denmark.

Sides which are too thin or not sufficiently firm are classified as No.1.-L. All sides which show bruises, black hairs, split backs, cuts in back fat, soft fat, damage due to scalding or singeing or bad coloured skin are classified as "secunda." Necks are cut off, clean trimmed, no loose fibres left hanging, shoulder pockets must be as small as possible and the cavity free from fibres or pieces of muscle. Teats must be cut off, fillets must be taken out neatly so as to leave a clean level surface. From May to October the pockets are filled with salt bags approved by the veterinary officer. Forelegs are cut off at the highest joint of the knee, and the hind legs cut off through the middle of the hock bones. In baling all the sides in one bale must be uniform as to weight, type and fat, length, and the sides must be packed so that the loin side of one side lies against the abdomen side of the other side. Wooden labels are attached to the bales giving the weight of the bale and the quality Nos. 1, 2, 3, 1-L or "secunda." All wrappers must completely cover the sides, yellow cord is used on "secunda" bales. All railway trucks and holds of ships must be clean before transport and sides when in transport must not be bent.

Hygiene

This is a very essential feature in all meat preparations, and it receives careful attention in the production of Danish bacon. Regulations make it



No. 5.—Markings on Skin of Bull.

ARTICLE BY LT.-COL. T. DUNLOP YOUNG, O.B.E., M.R.C.V.S., D.V.S.M., ON PAGE 408.

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compulsory that the air is frequently renewed in the cooling, salting and draining rooms; ceilings and walls which are not tiled must be well lime-whited, and all wood and iron work well painted; special boots are used by employees and cleaned in brine before work begins; no salt deposits are allowed to accumulate, weight boards and levers must be kept clean and all tanks, floors, walls, wooden rails or anything with which the bacon may come into contact must be scrubbed with brine after treatment of each lot of bacon. Carts, scales and tables must be cleansed before each baling. Brine which has been in contact with the floor or used for washing purposes must not be re-used for salting purposes.

By-Products

It is not necessary to deal separately with such products as they are in Denmark utilised as in modern meatwork practice. Blood is converted into meal, some factories make albumen. Fat is prepared and packed in bladders, barrels, boxes or pound packets. Plucks are sent to Germany, other offals are sold locally; feet are salted and exported to the Gold Coast of Africa. Intestines are prepared as sausage casings.

Trimmings and other meats are converted into sausages and a considerable trade is done in canned goods. Inedible offal is treated generally on the "wet process," but the "dry rendering process" is gradually being adopted as it is more suitable for preparing animal foods.

Government Control

An inspector is appointed by the Ministry of Agriculture in conjunction with the co-operative bacon factories. He causes bacon to be judged at the principal export port at frequent intervals. Judging is done by a panel of managers of bacon factories. If defects are found the factory from which the bacon was derived is noted and a report sent to the Ministry. The factory is notified of the contravention of any regulations and this may be followed by a heavy fine or even forfeiture of permission to export bacon.

Summary

The great success of Denmark in the production of bacon is chiefly due to the following facts:—

Co-operation in dairying and bacon production, the basic food for pigs being milk and barley. Research carried out by Government, veterinary, agriculture and farmers' united efforts. Uniformity of a standard bacon pig, methods of housing and feeding, brining, draining, grading and general hygienic handling.

Government veterinary meat inspection; prices fixed weekly for live pigs, with distribution of profits annually to pig producers. To such an extent has co-operation developed that in fixed areas all over Denmark Co-operative

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Knackeries exist into which there are carted daily all waste material from private slaughterhouses and dead animals from farms and villages, as also any waste material which can be, and is, converted into animal foods, or if not suitable for that purpose, utilised as manure.

So successful have these been that old factories are being replaced by new ones erected on the latest hygienic principles and fitted with dry-rendering machinery.

CYSTICERCOSIS IN PIGS AND CATTLE

WITH SPECIAL REFERENCE TO SOUTH AFRICAN CONDITIONS

By LT.-COL. DUNLOP YOUNG, O.B.E., M.R.C.V.S., D.V.S.M.

Dr. Viljoen, M.R.C.V.S., Superintendent of Abattoirs, Bloemfontein, in a Thesis for D.V.Sc., has made a very useful survey of cysticercosis, the "measles," bladderworm or larvæ found in the muscles of the pig and oxen.

The Thesis is so long, extending to 233 pages, that we have taken the liberty to condense it for the benefit of our readers.

Dr. Viljoen states the adult resultant tapeworms in man are so closely related that one cannot be successfully described or discussed without investigation of the corresponding stage in the others.

The normal intermediate host of one of the parasites is the pig and the final host of the mature tapeworm is man. Under certain circumstances, however, man may actually be the host at both stages, while the dog and monkey may also be the intermediate hosts of the pig bladderworm.

Ethymological Discussion

The intermediate stage of certain tapeworms is known as the cysticercus stage and the pathological infection as cysticercosis. The name cysticercus is derived from the Greek words Kystis, a bladder, and Kerkos, a tail. The pig bladderworm is known as C. cellulosæ and the beef bladderworm as C. bovis (or Inermis, i.e., unarmed, no hooks).

The adult tapeworms are termed Tænia solium and T. saginata respectively. The latin Tænia is derived from the Greek word Tainia, a ribbon or fillet.

It is difficult to account for the use of the word "measles" which must

be very misleading to laymen, yet it has been used since the Middle Ages. How the Afrikaans came to use the word "masels" or "mazelen" is mere conjecture, and it is not known whether "measles" was an indigenous disease in South African early native stock, or introduced by "carriers" from settlers.

Historical

It is doubtful what Moses meant by the term "unclean" with reference to swine, i.e., whether meant physically or due to diseased condition. Viljoen goes into long historical details in the survey culled from various literature and quotes Kuchenmeister's experiments on feeding persons condemned to death with cysticerci followed by post-mortem examinations, also Leuckart's experiments on feeding cysticerci to calves followed by post-mortem examination revealing cysts in every part of the body, particularly in the breast, neck and psoas muscles.

Incidence of Cysticercosis in Bovines and Porcines

Great Britain

Judging from the reports of medical officers of health and veterinary officers in charge of abattoirs cysticercosis is practically non-existent in Great Britain, but it has to be admitted that a really systematic examination for the presence of the cysts in pork and beef carcases is rarely, if ever, carried out. We must, therefore, not assume such cysts do not exist, because Dr. Robertson, of Leith, Scotland, reported (1920) that he accidentally infected some of his patients when he had placed them on a raw beef diet for tuberculosis. Stockman (1903) and Cameron (1933) declared that both species are sometimes met with in the British Isles.

Country	*C. cellulosæ*	*C. bovis*	*Remarks*
Austria	0.12	0.19	—
Arabia	—	—	No statistics
Australia ...	—	—	Practically nil
Argentina ...	0.4	0.4	—
Angola	—	—	No statistics
Abyssinia ...	—	—	No definite statistics, but nearly all natives infected
Belgium	—	—	Practically nil
Bulgaria	0.39—2.45	2.97—5.8	—
Brazil	—	—	No definite statistics
Bechuanaland Protectorate	1.15	—	—
Basutoland ...	2.0	—	—
Belgian Congo ...	—	8.7	—
Czechoslovakia ...	0.3	0.08	—
Cochin-China and Annam ...	0.33	0.85	—

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Country	*C. cellulosæ*	*C. bovis*	*Remarks*
China	—	—	No statistics
Canada	—	—	Practically nil
Central America	5.0	Rare	—
Chile	3.8	„	—
Denmark ...	—	0.18—2.90	—
France	0.03	3.5—17.42	—
French Guinea ...	—	50.0	In certain areas
Great Britain ...	—	—	Vide remarks
Germany	0.3	1.12—3.50	Increase due to better technique
Holland	*	0.69—1.64	*Only three cases in two years
Hungary	1.03	0.18	—
Italy	—	—	Practically nil
India	50.0*	1.0	*In some districts
Japan	—	33.0	In some districts
Kenya	0.2	10.0—21.0	Native animals
Lithuania ...	0.38	0.10	—
Malaya	1.17	0.0004	—
Madagascar ...	4.0—12.20	0.09—3.0	—
Northern Rhodesia	5.0	2.7	Mostly in native animals
Netherland East Indies	0.6—3.0	3.26—30.0	—
New Zealand ...	—	—	Practically nil
Portugal	0.2	0.003	—
Palestine ...	0.1	6.0—8.0	—
Persia and Afghanistan	—	—	No statistics
Philippine Islands	1.0	—	No statistics as to C. bovis
Portuguese East Africa	3.6	3.15	—
Rumania	0.77	0.01	—
Russia	1.68—3.21	—	—
Spain	0.29	—	—
Sweden	0.006	—	—
Syria	—	18.86	—
Siberia	0.6—12.5	—	—
Siam	—	1.14	—
Southern Rhodesia	6.7	0.38	Mostly native animals
South-West Africa	10.0	0.2	—
Senegal	—	10.0	—
Sierra Leone ...	—	0.2	—
Tunis	Rare	2.25	—
Tanganyika ...	—	2.3—3.4	—
U.S.A.	1 in 5,000	0.1—1.0	—
Union of South Africa	5.16	2.68	In native animals
Yugoslavia ...	0.5—3.0	—	—

(From the personal observations of the Abstractor in various countries statistics are rarely reliable due to the fact that only a few countries make a systematic examination for cysts, and animals killed in private slaughterhouses are rarely examined for parasites.)

Dr. Viljoen goes on to describe the development and life cycle of the cysticerci and predilection sites which are well known to veterinarians.

C. Cellulosæ

In slight infection few parasites may be found, but in heavy infection it is common that hardly a fraction of an inch of a carcase may be noticed free from cysticerci.

Hutyra and Marek (1916) are quoted by Viljoen in describing predilection sites, e.g., muscles of shoulder, chest, abdomen, neck, diaphragm, intercostals, adductors of thigh. In very heavy infestation the parasites have been found in the brain, eye, liver, spleen, lungs, lymph glands and fat.

C. Bovis

Mastication muscles	83 per cent.
Tongue	14 per cent.
Shoulder	12 per cent.
Adductors	11.6 per cent.
Cervicals	7.5 per cent.
Intercostals	4.8 per cent.
Psoas	4.5 per cent.
Infra-vertebral	3.8 per cent.
Sternal	2.6 per cent.
Diaphragm	2 per cent.
Abdomen	1.8 per cent.
Heart	1.5 per cent.

Judgment of Measly Carcases

In England

Memo 62/Foods (Section V [a]): "The entire carcase and all organs shall be condemned if evidence of any of the following conditions is found:

"(6) C. bovis—if generalised in the meat substance.

"(7) C. cellulosæ—if generalised in the meat substance."

In Scotland

Meat Regulations. Section A, Part V (1924):

"C. cellulosæ—the whole carcase and all viscera of pigs infected shall be condemned.

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"C. bovis—the meat may be placed in cold storage at a temperature not higher than 20 degrees F. for a period of at least three weeks."

Germany

Ostertag (1934):

C. cellulosæ.—In mild infestation in swine the flesh is fit for food when cooked, steamed or pickled, but not when chilled or frozen.

C. bovis.—The fat of infested swine is fit for use:

(1) Meat slightly infected may be sold after being treated in a "freibank"; or

(2) If pickled for twenty-one days in 25 per cent. brine solution; or

(3) Preserved for twenty-one days in cold storage at 3 degrees C. and a moisture content of 70 to 75. Badly infested meat is to be destroyed.

Holland

C. bovis.—If slightly infected, passed:

(a) After sterilisation; or

(b) Ten days in chamber at —10 degrees C.; or

(c) Pickled for three weeks in 20 per cent. brine.

France

If slightly infected, passed, after:

(a) Heating; or

(b) Pickling; or

(c) Freezing.

Syria

Meat condemned if heavily infected.

Meat passed if only one or two measles found.

U.S.A.

C. cellulosæ.—Meat passed for sterilisation if slightly infected; heavily infected carcases are rejected.

Canada

C. bovis.—If only slightly infected, carcases may be kept in cold storage for twenty-one days, *but if intended for export they are rejected.*

Australia

C. cellulosæ.—Nil.

C. bovis.—Only one outbreak observed. All meat destroyed.

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South Africa

Union Public Health Act, 1919:

Carcases infected shall with viscera be condemned, save when:

(a) Less than ten cysts are found;

(b) Less than six cysts are found in carcase apart from the viscera.

(c) Kept in cold store under supervision of the local authority at a temperature of —10 degrees C.

Effects of Cold Storage on Cysticerci

Ostertag stated:

One person ate 2 cysts after sixteen days in cold storage.—No tænia.

One person ate 1 cyst after nineteen days in cold storage.—No tænia.

Nine persons ate 52 cysts after twenty days in cold storage.—No tænia.

Thirty-one persons ate 166 cysts after twenty-one days in cold storage.—No tænia.

Four persons ate 15 cysts after fourteen to nineteen days in cold storage. —Ten tænia.

Van Santen found 70 per cent. of measles alive after twenty-one days' cooling, and recommended extending cold storage of measly meat to at least forty days.

Viability Tests with Measles Taken from Chilled and Frozen Meat

The abstractor carried out many tests as to viability of cysts in imported beef and mutton, but failed to find any of them alive.

Location of Cysticerci in Man

Dr. MacArthur, Britain (1934), found C. cellulosæa cysts in the muscles or subcutaneous tissue of any part of the body. Vosgien found the predilection sites of C. cellulosæ in man to be:

Eyes and adjoining structures	46 per cent.
Brain and nervous centres	40 per cent.
Skin and cellular tissues	6.32 per cent.
Muscles	3.7 per cent.
Other organs	3.2 per cent.

Eradication of Cysticerci Tæniasis

It is essential to take steps to eradicate cysticerci tæniasis by complete co-operation between the medical and veterinary professions, and especially by careful inspection of meat intended for export to Great Britain.

To all interested in the foregoing subject I would recommend them to read the full text of Dr. Viljoen's Thesis contained in the *Onderstepoort Journal of Veterinary and Animal Science Industry,* Volume 9, No. 2, October, 1937.

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ANIMAL TRYPANOSOMIASIS OF THE GOLD COAST

By J. L. STEWART, M.C., M.R.C.V.S.
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UNLIKE East Africa, the fly-belt proper does not exist in West Africa. While the dominant fly in East is *G. morsitans,* in the West flies of the *G. palpalis* group are usually the problem. Tsetse flies of this type require low shade and the presence of water for breeding and existence, though they can manage to live under adverse conditions for limited periods.

This article deals with domestic animals, therefore the tsetse bionomics concerned are those of the livestock areas, which vary from open plains to fairly thick savanna or what is popularly known as orchard bush. The tsetse flies of the rain forest differ, save for the ubiquitous *G. palpalis.*

Flies of the *morsitans* group, so feared in East Africa, are represented by *G. submorsitans,* which in the Gold Coast is largely an occupant of very sparsely inhabited country and has the reputation of being mainly a game fly and not of much account to man or his animals. This supposition is open to doubt but little work has been done in connection with the trypanosomiases transmitted by *G. submorsitans* so that represents a fruitful field for investigation. A number of malignant cases of trypanosomiasis in cattle occurred last year in an area to which *G. submorsitans* has just spread.

However, flies of the *G. palpalis* group are of most importance at present, as they are the inhabitants of the more populated and of the livestock areas and are the main transmitters of the disease. Until recently it was thought that sleeping sickness was negligible among the people, but this has been proved inaccurate, so that much more work is being done on the human side. Very roughly, the dry season lasts half the year and the wet the other half. In the dry season *G. palpalis* is confined to rivers and streams where there is low shade and water, though the latter may merely consist of a pool here and there. Thus in order to get infected an animal must go to the fly, which is of frequent occurrence, as these water courses are often the only water supply for many miles. In the wet season, when tributary streams fill up, when the sun is not so hot, when there is abundant shade and large numbers of animals, both domestic and wild, and the human population can obtain water without visiting the rivers, then the tsetse fly sallies forth throughout the country in search of its food. Thus it will be seen that during the dry season the tsetse areas are mere lines here and there, while during the rains these expand and very large areas may be occupied by tsetse fly. One of the members of the *palpalis* group, *G. tachinoides,* is peculiar to West Africa and is the hardiest species of *palpalis,* as he can

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FIG. 1.—Before Clearing.

FIG. 2.—After Clearing.

ARTICLE BY J. L. STEWART, M.C., M.R.C.V.S., ON PAGE 422.

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exist under drier conditions and is the tsetse fly of the more open country. I have looked over a piece of country which had hardly a tree within sight, but on investigating a stream with scattered low shade here and there—and very thin low shade at that—*G. tachinoides* was found easily. Thus it can be seen that most of the livestock at some time of the year are liable to attack by tsetse fly, and consequent trypanosomiasis.

There are three common species of animal trypanosomes which have much about the same pathogenicity, though some animals are more liable to infection by one trypanosome than by others. These are *T. vivax,* the most common, which is a long protozoan with a free flagellum and a large kinetocucleus; *T. brucei,* a polymorphic organism with a marked undulating membrane; and *T. congolense,* a monomorphic trypanosome with a small flagellum, a small undulating membrane and a general stunted appearance. Other trypanosomes which are either uncommon or rarely pathogenic are *T. simiæ,* which has been found twice, causing great mortality in pigs; *T. theileri,* a very large parasite, which is occasionally pathogenic; *T. tragelaphi,* normally a trypanose of kob and the trypanosomes of animals other than domestic.

The horse is the most susceptible of the domestic animals. This is probably due to the fact that he is the most recent importation, there being very few equines in the Gold Coast until this century. Few horses are bred, but over a thousand are imported every year from the French colonies in the north. Trypanosomiasis is fatal unless treated, but if tackled in the early stages responds to treatment and the prognosis is usually favourable. *T. brucei* infection is the most unfavourable.

The indigenous cattle are descended either from the dwarf Shorthorn cattle of Africa or are a mixture of these and the humped zebu; this mixture is termed Sanga and does not have the hump, but other zebu points are easily seen. The zebu himself, though possessing a certain resistance to trypanosomiasis, is too susceptible for permanent residence in the Gold Coast but is sufficiently resistant for fifty thousand to be imported annually and survive the walk to the southern markets plus the time taken before eventual slaughter, which averages about three months from time of entry across the northern frontier. The local cattle have a high resistance and deaths from trypanosomiasis *per se* are infrequent. Save in the very open country along the northern frontier, cattle are usually infected as young animals, go through a period of unthriftiness thereby and eventually add an individual to the breed resistance. Nevertheless, trypanosomiasis causes stunted growth, poor development, slow maturity and general unhealthiness. The incidence of pathogenic trypanosomiasis is far from being in direct proportion to the incidence of fly. One of the best cattle areas, British middle Togoland, is fairly heavily infested with fly and yet there is little or no trypanosomiasis and the youthful unthrifty period is usually absent, in spite of the fact that all these cattle are continuously exposed to tsetse infestation, but conditions

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are good with ample, good water supply and permanent grazing. As far as indigenous cattle are concerned, it appears that bad conditions are necessary as well as tsetse infestation to cause real trouble from trypanosomiasis. Where trypanosomiasis is an economic problem is during the process of anti-rinderpest immunisation. All the cattle of the Gold Coast have been immunised against rinderpest and the young cattle are treated at district camps at the age of two years. The unhumped cattle are very susceptible to rinderpest and the susceptibility increases with the incidence of trypanosomiasis, so that in this colony the extraordinary paradox occurs of the smaller the cattle the higher the dose of anti-rinderpest serum and vaccine.

In anti-rinderpest immunisation a preliminary small dose of vaccine is given, followed by double inoculation of virulent blood and anti-rinderpest serum; it has been found that cattle from known bad tsetse areas are much more liable to casualties at immunisation camps, though trypanosomiasis seldom appears as the killing agent but appears to act as a catalytic agent to break down the resistance to rinderpest. Thus the incidence of trypanosomiasis and tsetse fly has to be studied carefully and cattle from such areas given a higher dosage of anti-rinderpest products.

None of the three main species of trypanosome appears consistently more virulent than another. One specific breed of West African cattle, the N'Dama, a tawny, long-horned, unhumped animal originally from French Guinea, appears to have a very definite breed resistance to trypanosomiasis which holds good wherever he goes. Many of the local cattle have a high resistance to the local strain of, say, *T. vivax,* but develop clinical symptoms to a different strain of the same parasite. Though trypanosomiasis is not a killing disease of local cattle, it represents a very definite limiting factor to cattle development and improvement; it inhibits the possibility of grading by means of European breeds, though these thrive well in non-tsetse infected parts of West Africa. It is responsible for dwarfism and general poorness among many of the indigenous cattle themselves, and is one of the real problems affecting the beef industry.

The pig appears to be peculiarly susceptible to *T. brucei,* though *T. simiæ,* which wipes out a herd in no time, occurs occasionally and *T. congolense* infections are found from time to time. *T. vivax* has never been identified in pigs in the Gold Coast. In pigs the disease is a killing one but follows a chronic course with vague symptoms. It responds usually to treatment, and imported European pigs recover as readily as do the indigenous African animals. Dogs are very badly affected by *T. congolense,* and treatment is difficult, but recoveries from *T. vivax* and *brucei* are usually uneventful when treated.

Treatment is much the same for all animals and broadly follows the lines of antimony compounds for trypanosomes of the *vivax* and *congolense* groups and arsenical preparations for those of the *brucei* group. Tartar emetic still

takes first place as a curative and relapses from this drug are uncommon, though its allied, so-called non-toxic preparation, antimosan, frequently fails to effect a permanent cure. The combination of tartar emetic interspersed with injections of novarsenobillon is excellent for *T. vivax* infections in horses. For *T. brucei* infections of horses, five injections of tartar emetic interspersed with novarsenobillon and along with three-weekly injections of nagonal of dosage 2, 3 and 4 grammes respectively has yielded very good results. Nagonal alone for *T. brucei* in pigs and dogs is used.

Much good work has been done by attacking the tsetse fly as a preventive measure. The principle is to eliminate the low shade within the banks of permanent streams and rivers and so drive away the fly, which requires the two factors of low shade and water. This method is applicable to circumscribed, though nevertheless large, areas, but obviously cannot be applied to the whole country. The Veterinary Department has been instrumental in pioneer efforts and has been completely successful in eliminating tsetse fly from the large valley where its headquarters of Pong-Tamale are, a valley comprising about a hundred square miles of country, and eradicating tsetse from the large town of Yendi and its environs in Northern Togoland, as well as numerous smaller clearings.

Eradication of low shade is also used to prevent dry season infection at river crossings, fords and watering places; clearings half a mile or so wide are made, and in the dry season fly will not venture into them on account of the intense heat of the sun and the great dryness of the atmosphere, though in the wet season fly will readily invade these clearings, when, however, traffic in man and animals has become reduced to a fraction of the dry season incidence.

THE TREATMENT OF CANINE BABESIASIS WITH ACAPRIN *

By H. R. BINNS, M.R.C.V.S.
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FOLLOWING the initial discovery by Kikuth of the therapeutic action of the I.G. Farbenindustrie's drug Acaprin in Babesia canis infection, numerous results of experimental and clinical trials with the drug in the treatment

*The author also notes a very valuable suggestion in regard to the use of this drug for native cattle suffering from Babesia bigeminum infection, which will be much appreciated by those who have to carry out the practical aspect of treatment of this kind in these semi-wild animals.—EDITOR.

of various piroplasmoses of domestic animals have been reported from most parts of the world in which these diseases occur. The earlier results obtained with Acaprin have been summarised by Kikuth (1935), who gives a full list of references to published papers, and to private communications received by him, the contents of many of which have since been published. This summary and subsequent papers to which, or to abstracts of which, one has been able to refer indicate that Acaprin is an effective specific for a number of piroplasmoses, a wider range of diseases having been successfully treated with Acaprin than with any other drug hitherto used. So far as one has been able to determine from the accessible literature on the subject, the majority of these papers describe the use of Acaprin in the piroplasmoses of farm stock, comparatively few records of the treatment of canine babesiasis having been published. Kikuth (1935) refers to his original investigations with the drug, and quotes a private communication from Lawrence, who confirmed his findings in Southern Rhodesia. Carmichael (1935) records the successful treatment of twenty-four cases in Uganda. Mettam (1936) states that Acaprin gives good results in the treatment of bovine and canine babesiasis. Cuillé, Darraspen and Florio (1937) report favourable results with "Zothelone," the French equivalent of Acaprin. I have been prompted to record this note by the seeming scarcity of published accounts of the use of Acaprin in canine babesiasis, and by the fact that in assessing the value of the drug the greater the quantity of information collated the more useful the final assessment will be.

Cases and Treatment

During the past eighteen months thirty consecutive cases of Babesia canis infection were treated with Acaprin. It is not proposed to describe the symptoms and response to treatment of each dog. It is sufficient to record that the thirty cases may be divided into the following groups, according to the syndromes the dogs were showing when first examined; this classification is inevitably arbitrary and ill-defined, but will give an approximate indication of the types of infection treated.

Eleven were early acute cases presented for treatment shortly after the dog was seen to be ill, and found to be showing the typical high temperature with a varying degree of febrile symptoms and depression, slight anæmia, and usually a comparatively heavy blood infection. Eight were classed as the moderately advanced acute type of case, showing febrile symptoms with considerable depression and weakness, a well-established anæmia, some jaundice, and a varying number of parasites in the blood. Five were advanced infections, with very severe anæmia and jaundice, and great weakness and collapse; two of these dogs were so weak as to be scarcely able to stand. Six were chronic cases, showing the characteristic low temperature, listlessness,

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capricious appetite, marked anæmia with advanced regenerative changes in the blood, and progressive emaciation.

In each case treatment consisted of a single subcutaneous injection of 0.1 c.c. of a stock 0.25 per cent. solution of the drug per kg. of body weight. The stock solution was prepared by diluting one 6 c.c. ampoule of 5 per cent. Acaprin, as issued by the manufacturers, with 114 c.c. of sterile distilled water, and storing in a glass-stoppered bottle. This solution keeps well and appears to be as effective after six months as when first prepared. After-treatment consisted of the nursing, invalid diet, and (when indicated) the iron and arsenic tonic, usually prescribed in cases of canine babesiasis.

The results obtained with Acaprin have been striking. The majority of cases showed marked remission of symptoms within twenty-four hours, followed by rapid and complete recovery. In nine cases the improvement was slower, but was very evident after forty-eight hours and recovery was uninterrupted. There appeared to be no relation between the severity of the infection and the response to the drug; as would be expected, recovery from anæmia was more gradual in cases where it was severe than in the early acute infections showing slight anæmia.

Within fifteen to thirty minutes of injection, seventeen of the dogs showed some or all of the symptoms, due to the pharmacological action of the drug, which have been described by many workers who have used Acaprin. The symptoms produced are salivation, restlessness, recumbency, muscular tremors, accelerated respiration, vomiting and defæcation. There was much variation in individual cases in the degree of symptoms shown. These effects do not appear to cause undue distress to the dog, and generally pass off within an hour or less. Thirteen dogs appeared completely unaffected. No relation was observed between the occurrence of pharmacological symptoms and the degree of infection or the rapidity of recovery. None of the dogs showed any serious symptoms which could be ascribed to the toxic effect of the drug.

Kikuth (1935) states that Hecht, who originally investigated the pharmacology of Acaprin, determined that toxic doses caused excessive stimulation of the para-sympathetic nervous system. The secondary symptoms described above are presumably due to para-sympathetic stimulation, and one assumes that following the administration of an overdose in the treatment of canine babesiasis, these effects would be both severe and lasting, rather than the mild transient symptoms usually seen. Although these pharmacological effects appear to be of little significance, so far as the condition and comfort of the dog is concerned, they indicate that *the margin between therapeutic and toxic doses of Acaprin is a narrow one, and emphasise the importance of careful weighing of the dog and computing of the required dose.*

In no case was there any sign of local irritation at the site of injection. No relapses have occurred in any of the thirty cases.

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Discussion

The results of treatment of the thirty cases of canine babesiasis, recorded in this communication, confirm the recent favourable reports of workers who have used Acaprin in canine babesiasis. Since the discovery, by Nuttall and Hadwen in 1909, of the therapeutic action of Trypanblue in Babesia canis infection, this drug has been the specific commonly used in the treatment of canine babesiasis, and it is considered that a discussion of the efficacy of Acaprin should include a comparison of the drug with Trypanblue.

Acaprin has several advantages over Trypanblue. It is easy and pleasant to use. In contradistinction with Trypanblue, it does not stain the hands or the tissues of the dog. Although not strictly within the scope of this paper, it may be mentioned here that the advantage in this respect of Acaprin over Trypanblue is much greater when it is being used in the treatment of Babesia bigeminum infection of cattle under African conditions. There is a big difference between the ease of giving a subcutaneous injection of 5 or 6 c.c. of 5 per cent. Acaprin, and the slow intravenous administration of 100 to 150 c.c. of Trypanblue solution to a struggling ox, which in many instances is unaccustomed to being handled and is usually not very effectively restrained by several natives who are often as frightened as the ox. The required dose is small and is rapidly and simply administered, causing a minimum of distress to the patient and producing no local irritation. This is in marked contrast with Trypanblue, of which a large dose must be injected very slowly indeed if the danger of abscess formation and sloughing is to be minimised.

Although it is not easy to assess accurately the relative therapeutic efficacy of the two drugs, Acaprin would certainly appear to be the more effective. Improvement and complete recovery are usually more rapid in cases treated with Acaprin. Relapses after treatment appear to be uncommon. None of the thirty cases recorded in this paper relapsed, and Carmichael (1935) states that no relapses followed the treatment of his cases in Uganda.

Summary

(1) The treatment with Acaprin of a clinically representative series of thirty cases of Babesia canis infection is recorded.

(2) All cases recovered rapidly and completely, and none subsequently relapsed.

(3) The merits of Acaprin are briefly discussed, and the efficacy of the drug is compared with that of Trypanblue.

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Clinical Articles

CLOVER TYMPANY IN CATTLE

By RICHARD HUDSON, F.R.C.V.S.

Retford.

DURING the early morning of October 11 a number of cattle broke out from a field and into another of second crop of seeds—clover and rye grass. The crop was about twelve inches or more in height and there had been a heavy dew. It was chiefly red clover.

When found about 7 a.m. several were noticed to be tympanitic, and whilst being driven out one fell over into a shallow drain and died. Another was so distressed in breathing that the owner hurried off for a neighbour to help him, and the two, having administered a draught, saw it die within a few minutes.

I was then 'phoned for, and on arrival found two "blown up" so tightly and almost suffocating that I thought they would die before I could operate. Fortunately one vomited a large quantity of semi-fluid rumen contents and then got some relief.

The rumen was punctured with a large trocar and cannula, and for a minute nothing escaped, then a few dirty bubbles appeared, but nothing to reduce the pressure. The stomach pump was resorted to with a rubber end from an enema syringe fitted into the tube. This just fitted the cannula and through it was slowly pumped the following mixture: sodium chloride, 8 or 10 ounces; turpentine, 2 ounces; formalin, 1 ounce; water, half a gallon.

The cannula was left in position, but very little gas escaped. However,

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fermentation was being arrested and the pressure reduced, and in about an hour they were safe to leave.

Three others were hoven in a less degree, but while treatment of the two serious cases was proceeding they lay down and commenced to chew the cud, and came all right without treatment.

Along with potatoes, wet clover is about the most dangerous of foods for stock, fermenting rapidly and in such a way that the gases are mixed with food and cannot escape through the cannula.

It has been suggested—Begg—that the abdominal wall should be incised, the rumen sutured to the edges of the incision and opened freely to allow the contents to escape. This operation may be all right for cows, but for eighteen-month-old heifers which have not been tied up and which are kicking and fighting most of the time, it is another problem.

The patients were fasted for twenty-four hours and then fed sparingly with scalded bran and a little chop. Two days after they were allowed out on pasture and have done satisfactorily.

ENTERO-TOXÆMIA OF SHEEP

By J. W. HALL MASHETER, M.R.C.V.S.
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"It (entero-toxæmia) apparently does not occur in flocks under conditions of arable management." (Report of the Agricultural Research Council, 1938, p. 239, Sheep Diseases in England and Wales.)

I should like to put on record the occurrence of this disease in sheep folded on arable land and fed on kale and turnips, plus meal and cakes.

Flock 1 consisted of 125 yearling sheep, 12 deaths 9.6%
Flock 2 consisted of 70 yearling sheep, 8 deaths 11.4%
Flock 3 consisted of 150 yearling sheep, 35 deaths 23.3%

As the *maximum* mortality recorded in the Report was 3.5 per cent., it would appear that the condition is more fatal on arable land than on grass grazings.

Post-mortem appearances were similar in all these cases, but material from one flock only was sent to Dr. Montgomerie for examination in January, 1938.

His report, briefly, was as follows:

"From the intestinal contents of this case we were able to demonstrate

the presence of a toxin neutralised only by B. Welchii type D. anti-toxin. We have also good evidence that this type of Welchii was present in abundance in the intestines."

The sheep in flocks 1 and 2 were all treated by type " D " anti-toxin. One sheep in flock 2 died after treatment, but as no post-mortem was made I am unable to say whether the death was due to Welchii toxin or not.

The deaths recorded above all took place before treatment. Flock 3 may be regarded as " controls," as although post-mortem appearances were the same the owner decided not to have them treated.

Abstracts

CRITICAL AND EXPERIMENTAL STUDY OF AVITAMINOSIS E.

Bulletin de l'Academie Vétérinaire de France.

In this article, sent in the course of the competition for the Weber prize under the epigraph, "*L'experience seule dirige les hommes,*" the author advances some clinical facts on avitaminosis E and its treatment, in connection with which he discusses the ætiology of abortions frequently observed in domestic females.

He commences by briefly recalling the actual state of our knowledge on vitamin E, its distribution in natural foods, its chemical properties, disturbances which provoke its absence in the male and female, its titrage in the foods and purified extracts. Its absence in the male produces disturbances of the reproductive function and progressive lesions which end in sterility and atrophy of the testicles and annexed glands; in the female no functional alteration is observed in particular of the ovarian cycle, but the impossibility of carrying out gestation to the full term. All these results have been obtained almost solely in the rat.

Vitamin E has been employed in humans, as well as in animals, to treat sterility and abortion. The author mentions particularly the results obtained in the cow in the treatment of epizootic abortion. Three observations form the basis of his conclusions.

In a rabbitry comprising twenty does numerous abortions occurred and

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bacteriological study of a fœtus led to the discovery of the presence of paratyphus B. The animals were treated with an auto-vaccine but no female would accept the male. At this time the author tried subcutaneous injections of extract of wheat germ oil on half the subjects; the remainder served as controls. Ten of the treated females, after injections made at an eight-day interval, could be covered; the ten controls remained frigid, until an identical treatment led to the similar favourable result.

A second very analogous observation but without paratyphosis made on fifteen rabbits gave similar success. A third trial, on the contrary, in two rabbitries, on two and three rabbits respectively, gave no result.

These facts show that vitamin E can influence favourably in certain cases disturbances of the œstral cycle which are the cause of frigidity. However, without doubting the results obtained, it should be mentioned that they are not in accord with experimental facts reported by the author himself, who showed that avitaminosis E in rats occasioned no disturbance of the genital apparatus of the female.

It was impossible to find in the feeding of the animals observed a cause of absence of vitamin E. The author thinks that often digestive absorption can be insufficient, which justifies the introduction of the vitamin by the parenteral way. In infectious causes of abortion an alimentary or digestive factor is added which it is difficult to separate with precision and which justifies the therapeutic use of vitamin E.

ANIMAL DISEASE CONTROL IN ARGENTINA

For the better control of diseases of livestock the Argentine Government has passed a law which makes it obligatory for owners of cattle, sheep and pigs intended for freezing works or markets to have the same examined by a Government district veterinary inspector before leaving the property. The owner has to give adequate notice of intention to move stock, and the animals must be taken from place of origin to the destination specified within forty-eight hours of date of inspection. The health certificate has to accompany the stock, whether sent by rail or by road. In the event of any suspicious signs of disease being shown after the certificate has been issued, the animals must not be moved until again inspected.

When the inspector is on his way to examine stock, he is ordered to make inquiries along the route to be travelled if there is any disease. Should

such be revealed he may order the owner of the certified animals to use another road. The inspector also has to examine stock in paddocks adjoining those to which the application refers. No certificate will be issued if there is any probability of infection or contagion.

The cost of inspection of animals intended for meat works or markets will be borne by the Government.

—From *The Review of the River Plate.*

FACIAL ECZEMA IN STOCK

THE NEW ZEALAND OUTBREAK

It has been announced that Government has granted £10,000 for immediate research into the disease which, seeing that the estimated losses suffered by sheep and dairy farmers totalled all of £1,000,000, does not appear to be an excessive amount. —*Pastoral Review.*

ARGENTINE MEAT TRADE

NEW £3,000,000 FRIGORIFICO PLANNED

A Bill has been submitted to the Chamber of Deputies providing for a Government loan of 50,000,000 dollars (£3,000,000) to the semi-official Argentine Meat Producers' Corporation, to be devoted to the construction or purchase of a central " frigorifico " in the port zone of Buenos Aires and an unspecified number of similar establishments in other Argentine towns.

It is proposed that the new refrigerating and packing plant should serve both export and internal markets, and that the Government should have power to expropriate the land required for the site.

The Corporation, which during 1937 slaughtered 610,650 cattle and 401,880 sheep, at present employs the services of the various private refrigerating companies, possessing no frigorifico of its own.

A scheme submitted to the Argentine Congress last February for the construction of a 30,000,000 dollar frigorifico for the Corporation was criticised

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on the grounds that the establishments already in existence were sufficient to meet the requirements of the country, and were only working at about 75 per cent. of their capacity. The official view, however, is that in the long run the Corporation must run its own plant if it is to fulfil its function of serving as an instrument of control over the private firms.

—*Meat Trades' Journal.*

News

THE GOVERNMENT CENTRAL SLAUGHTER-HOUSE QUESTION

THE Livestock Commission have appointed Sir Francis Boys (Chairman), Mr. George Dallas and Sir Harold Howitt to be members of a Committee to advise the Commission on the technical and financial aspects of the design, equipment and management of experimental central slaughter-houses and of the matters for which provision may be made under a slaughter-house scheme.

The Committee have been authorised by the Commission to co-opt as members of the Committee for any particular meeting or meetings of the Committee any of the following persons: Messrs. W. Andrews, R. W. Austin, C. Bitterling, D. M. Brown, W. R. Brown, C. A. Coggan, G. H. Collinge, R. Duncalfe, T. H. Gill, C. Hallam, R. H. Hemmings, J. S. Hill, L. A. R. Hill, J. H. Hugon, W. R. Hunter, G. D. Pool, A. W. Ronald, J. G. Sutherland, A. T. Vernon, A. Waddington, J. W. Warren, A. Welsh, N. Williamson and R. Wood.

The Commission have appointed Mr. W. C. Beard to be Secretary of the Committee.

"BAYER" JUBILEE YEAR

THE discovery of one of the earliest antipyretics, "Phenacetin," in 1888 induced the dyestuff manufacturers, Friedr. Bayer & Co., of Elberfeld, to open a special pharmaceutical section. The results of this measure, namely, the success achieved in the fields of chemo-therapy and tropical medicine, the preparation of antipyretics and analgesics, narcotics, anæsthetics and disinfectants, as well as the advances that have been made in vitamin and hormone research, deserve special attention.

The close collaboration of the "Bayer" Research Institutes at Elberfeld

and Hoechst with the Behring works in Marburg has greatly benefited veterinary science. Such chemo-therapeutic preparations as " Entozon " and " Rivanol " are extensively employed in veterinary practice. The value of " Neosalvarsan " in the treatment of pleuro-pneumonia in horses is generally recognised. Such trypanosome infections as nagana, surra and dourine are effectively combated by " Naganol." The chemo-therapeutic preparations " Acapron " and " Prontosil " are of more recent origin. The former is specific in its action on the piroplasmoses of domestic animals; the latter is employed in the treatment of streptococcal and staphylococcal infections. " Prolan," the hormone of the anterior lobe of the pituitary gland, has attained great importance in the treatment of sterility. " Hypophysin " and " Orasthin " have supplied the veterinarian with valuable hormone preparations for obstetrics and for the treatment of puerperal diseases.

Only a few of the long series of sera and vaccines can be mentioned here: swine erysipelas serum (" Susserin "), tetanus anti-toxin " Behring," the well-known " Astibulin " sera for the treatment of joint-ill in foals, " Yatren " vaccines and the non-specific antigen, " Omnadin."

The Institute for Protection Against Virus Swine Fever in Eustrup, as the name implies, primarily serves the purpose of investigation into methods of protection against virus swine fever, but it also deals with the other virus infections, e.g., canine distemper.

Thus, at the end of the first fifty years, the veterinarian has at his disposal a large number of valuable " Bayer " preparations, and in this jubilee year of 1938 one may well hope that the future will be no less fruitful than the past.

GROWTH OF ATTESTED HERDS

On June 30, 1938, there were 2,680 attested herds in the United Kingdom, made up of 1,888 herds in England and Wales and 792 herds in Scotland.

This compares with 1,452 attested herds in the United Kingdom on December 31, 1937, made up of 812 herds in England and Wales and 640 in Scotland.

On June 30 there was a total of 140,000 attested cattle in the United Kingdom, made up of 79,000 head in England and Wales and 61,000 head in Scotland.

On December 31, 1937, there was a total of 87,329 head of attested cattle in the United Kingdom, made up of 36,896 head in England and Wales and 50,433 in Scotland.

Therefore the increase in the six months totals 52,671 head of attested cattle in the United Kingdom.

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It is pointed out in addition that probably another 140,000 head are "in preparation for registration."

Regarding "accredited" herds, when the Milk Marketing Board was born in 1933 there were only about 800 "Grade A" herds, as they were then called. There are now 22,300.

LONG LIVES OF ANIMALS

SOME correspondence has been going on in the papers with reference to the ages to which some of our domesticated animals live.

A cat belonging to Mrs. Jago, Albert Street, Romford, is 29 years old and still in good health.

According to "Hambletonian," in the *Meat Trades' Journal,* a horse named "Jack" has just died at Rothbury, aged 41 years. Another the same age was last year still alive at Cleadon. In 1936 a Shetland-pony died at Harby, aged 50 years. In 1932 there was a pensioned horse still in good health aged 44 years. A pony aged 40 years was owned by Miss Shaftesbury, in Dorset.

Miss Trotter, of Bishopsgarth, Stockton-on-Tees, had a pony still at work when over 41 years old. Mr. Maughan, of Lord's Lot Farm, Hexham, in 1932 had a pony, bred by himself, believed to be still alive, then 41 years old. A pony was destroyed due to injury, a few years ago at Sunderland, aged 45 years. Mr. Jesse Henley, of Seaton Ross, had a pony aged 40 years and another still working at Cardurnock at the age of 41.

Reviews

Special Pathology and Therapeutics of the Diseases of Domestic Animals. Hutyra and Marek and Manninger, 4th Edition. Edited by DR. RUSSELL GREIG with collaboration of DRS. MOHLER and EICHHORN. Published by Baillière, Tindall and Cox. Pp. 2,410. 724 illustrations. In three volumes. Price £6 6s.

IN the Special Congress Number of the Journal there appeared a preliminary notice on the fourth edition of that world-wide known veterinary work, "Special Pathology and

Therapeutics of the Diseases of Domestic Animals," by Hutyra, Marek and Manninger; Dr. Rudolph Manninger, the Professor of Infectious Diseases at the Royal Hungarian Palatin-Joseph University, Budapest, having been called into collaboration in the place of the late author, Professor Franz Hutyra, whose death has left a blank in the profession on the Continent which it is difficult to fill.

As in previous editions, the American Editors are our well-known *confrères*, Prof. J. R. Mohler, V.M.D., D.Sc., and Dr. Adolph Eichhorn, D.V.S., but it was to Professor J. Russell Greig, Ph.D., M.R.C.V.S., F.R.S.E., the Director of the Moredun Research Institute, Edinburgh, that the work of Editor-in-Chief was allotted. The task of bringing this work up to date must have been onerous, and the veterinary profession not only in Great Britain and America, but also our colleagues on the Continent owe a debt of gratitude to those who have given so much of their valuable time and energy to this task.

The publishers, too, must not be omitted in this professional debt as the three books are not only most clearly printed and arranged, but the illustrations, many of which are in colour, give most effective and accurate pictures which make the letterpress much more easily understandable to the practitioner as well as to the student.

For convenience the work is divided into three volumes, the first dealing with the acute general infectious diseases in such a comprehensive way that the book is not only a textbook for the daily use of the practitioner, but a complete encyclopedia and work of reference. Commencing with anthrax, there are chapters on the gas œdema infections, swine erysipelas, pasteurellosis, septicæmia neonatorum and typhoid ailments, influenza (not only of animals but also of men), African horse sickness, rinderpest, fowl pest, acute exanthematous infectious diseases such as variola and foot-and-mouth disease, the acute infections such as strangles and contagious pleuro-pneumonia of horses and cattle, malignant catarrh, calf diphtheria, tetanus, rabies, tuberculosis, glanders and other infectious diseases, whilst a whole chapter is devoted to the infective diseases caused by protozoa.

The second volume is devoted to diseases of the digestive organs which are dealt with in full detail. In volume three the diseases of the kidneys and bladder, blood and blood-producing organs and those of the brain and nervous system occupy some 500 pages, whilst those of locomotion and of the skin, parasitic and otherwise, take up a further 250 pages. Each volume is fully and most accurately illustrated, the whole three volumes taking up some 2,410 pages with 724 illustrations.

It is a book which no veterinary surgeon, whether he is a practitioner or in the Public Health or Colonial Services, can afford to do without, and, as has already been stated in the preliminary notice, although the price may seem a lot to invest in one book, it should be the aim of every M.R.C.V.S. and every college student to possess a copy, for even if it is found necessary to sacrifice in some other direction the result will be found to be well worth while. The mere fact that a textbook of this size has reached its fourth edition in the English translation, whilst it is also the universally acclaimed textbook in every country on the Continent and in America, is proof that the material within its covers must be good—and more conclusive still, it must be satisfying—and this is truthfully the case. A better combination of authors and editors could not have been selected, and it is with every confidence that we recommend it to our readers.

Die Fohlenlähme und ihre Bekämpfung (Joint Ill or Navel Ill in Foals), by Prof. Dr. Theodor Oppermann, of the Veterinary School of Hanover. Hanover: M. & H. Schaper, 1938. Pp. 46, with 3 illustrations. Price RM. 1.60.

This is a useful and handy monograph on joint ill in foals. In its pages and under the title of joint ill the author includes symptoms exhibited by foals, such as inanition, inability conditions and joint inflammations.

As causes of the condition he lists: (a) paratyphus infection; (b) pyoseptic infection; (c) coli-aerogenes infection; (d) streptococcic infection; and (e) infection through the virus of infectious anæmia.

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Infection through the navel is lucidly explained, and there are some excellent prints to illustrate the text.

Prophylactic measures, which are all explained, include:

(1) Limitation of the danger of infection by the digestive tract.

(2) Avoidance of navel infection by care and attention to the navel.

(3) Increasing the ability of resistance of healthy born foals against incidental infection.

(4) Attention to digestive disturbances of the foal.

(5) Treatment of mares during pregnancy.

In some concluding lines Dr. Oppermann calls attention to domestication as a big factor in the occurrence of joint ill and remarks on the freedom from this disease of foals born in the open under natural conditions. Fresh green vitamin-rich food helps to make all well. There is a comprehensive bibliograph.

The little brochure can be thoroughly recommended and the author can be congratulated on producing an up-to-date and desirable monograph on the subject.

Correspondence

CANADIAN CHILLED BEEF

The Editor, "Meat Trades' Journal."

DEAR SIR,—I have so often lectured on the right type of cattle to breed and feed that I cannot refrain from calling attention to the type of Canadian chilled beef which has been, for a few weeks, exhibited for sale on Burchnall's stall, Smithfield Market.

These sides of beef are, in my opinion, ideal—being from young cattle, quickly matured, with small bones, fat not excessive and equally spread throughout the body, thus no waste for the retail butcher. This is proved by the extraordinary fact that this week those sides are quoted at 5s. 4d. to 5s. 8d., while "Selected Scotch" made 5s. 2d. to 5s. 6d. This, in spite of the fact that this meat is "marked" and must be sold in the retail shops as "imported."

The dressing and handling of the carcases are an object-lesson to all slaughtermen. All British breeders and feeders should see this Canadian experiment.

Yours truly,

T. D. YOUNG.